

**Station KCET-DT • as DTV Channel 28 • Los Angeles, California
MB Docket 87-268 Seventh FNPRM Comments**

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained by Community Television of Southern California (CTSC), licensee of noncommercial TV Stations KCET, N28, and KCET-DT, D59, Los Angeles, California, to prepare an engineering statement in support of its comments to the Seventh Further Notice of Proposed Rulemaking (Seventh FNPRM) to MB Docket 87-268.

Background Information

In the initial Table of DTV allotments, KCET was assigned out-of-core DTV Channel 59, with an effective radiated power (ERP) of 190 kW. CTSC built the allotted and out-of-core D59 transmitting facilities, and has had licensed D59 facilities at 190 kW ERP (DA) since June 26, 2000. Further, CTSC holds a construction permit (CP) for maximized D59 facilities, FCC File Number BMPEDT-20000428ADF, authorizing operation at 340 kW ERP (DA). In its November 3, 2004, FCC Form 381 filing, CTSC specified the equivalent of those maximized facilities for its post-transition operation (which could not be on out-of-core D59). It is noted that because of the 2.5 dB difference in the dipole factor between Channels 59 and 28, the coverage of the maximized DTV operation at 340 kW ERP on D59 is equivalent to 190 kW ERP for operation on D28.

While the October 20, 2006, MB Docket 00-268 Seventh FNPRM assigned KCET-DT its requested post-transition channel of D28, the assigned power level was just 107 kW ERP. It is therefore the purpose of this engineering exhibit to justify the desired and maximized power level of 190 kW ERP (DA) on DTV channel 28.

In its January 21, 2005, Form 382 First-Round channel election, CTSC requested its in-core Channel 28 for post-transition operation. However, this election was initially disapproved because of greater than 0.1% predicted incremental interference to two stations: KFTR-DT, D29, Ontario, California (at 0.2%) and to KEYT-DT, D27, Santa Barbara, California (at 2.3%)*. The KFTR-DT facilities are located at the Mt. Wilson antenna farm, along with KCET and KCET-DT, but the KEYT-DT facilities are 177.5 km distant, at Broadcast Peak, near Santa Barbara.

In its August 15, 2005, *Notice of One In-Core Channel Special Treatment and Waiver Request*, CTSC submitted engineering studies showing that when the KFTR-DT facilities were studied using that station's main beam azimuth pattern† and actual elevation pattern with its combination of 1.5° of

* FCC letter dated June 7, 2005.

† The CDBS shows a station's horizontal plane azimuth pattern; so long as only ebt is used, the main beam and HPLANE azimuth patterns are identical; however, when mbt is used, the HPLANE and main beam azimuth patterns can be significantly different. See the attached Figure 1.



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electrical beam tilt (ebt) plus 1.0° of mechanical beam tilt (mbt) at 200°T, and when the proposed KCET-DT as D28 facilities were similarly studied using the KCET, N28, main beam azimuth pattern and actual elevation pattern with its 1.5° of ebt plus 1.5° of mbt at 195°T, and further when the depression angle to cells under study were correctly calculated based on the station's transmitting antenna height above mean sea level (AMSL) rather than the transmitting antenna height above ground level[‡], the incremental interference to KFTR-DT dropped to 0.01%. This is not surprising, given that the stations are effectively collocated (there is a separation of only 0.49 km between the two sites) and the stations have comparable powers (KCET-DT as D28 was studied at 190 kW ERP (DA), and KFTR-DT was studied at 400 kW ERP (DA)). Thus, because KCET-DT as D28 would have 3.2 dB less power than KFTR-DT, since the main beam directional antenna patterns are similar, and since the interference criteria for a lower-adjacent channel DTV-into-DTV is a desired-to-undesired (D/U) signal ratio of -28 dB, it is obvious that KCET-DT as D28 is not an interference threat to KFTR-DT. Further, even though the interference criteria for an upper-adjacent channel DTV-into-DTV is a D/U ratio of -26 dB (*i.e.*, 2 dB more stringent), it is also obvious, again because of the collocation, similar antenna patterns, and comparable powers, that the KFTR-DT operation is similarly not an interference threat to KCET-DT as D28. In summary, there is no conflict between KCET-DT as D28 and KFTR-DT, D29.

The August 15, 2005, filing also demonstrated that the true incremental interference to the KEYT-DT, D27, allotment (699 kW ERP), as opposed to the then-existing CP for 1,000 kW ERP (DA), was just 0.59%, well under the relaxed one-in-core channel 2% “*de minimis*” limit. The KEYT-DT D59 allotment rather than the KEYT-DT CP power was studied because in its Form 381 *Pre-Election Certification* Form, KEYT-DT selected “replication” rather than “maximization.”

Finally, the August 15, 2005, filing noted that at Paragraph 66 of the January 19, 2001, MB Docket 00-39 rulemaking (the first “DTV review” rulemaking), the Commission acknowledged certain main beam versus horizontal plane and depression angle calculation problems, and indicated that more accurate calculation methodologies could be used where doing so would “make a critical difference.”

[‡] There is a particularly significant difference for stations at the Mt. Wilson Antenna Farm between the transmitting antenna center-of-radiation (C.O.R.) height AGL and AMSL. For example, for the KCET antenna, the AGL height is just 100 meters but the AMSL height is 1,825 meters, and for the KFTR-DT transmitting antenna, the C.O.R. height AGL is 79 meters but the C.O.R. height AMSL is 1,820 meters. Similarly, for KEYT-DT, which also has a mountain top site, the AGL C.O.R. height is 24 meters but the AMSL C.O.R. height is 1,252 meters. Especially when UHF transmitting antennas are involved, with their relatively narrow elevation pattern half-power beam widths (HPBW) of typically 1.5° to 2.0°, the difference between a correctly calculated depression angle to a cell under study (based on the transmitting antenna's AMSL height) and the incorrectly calculated depression angle to a cell under study (based on the transmitting antenna's AGL height) can be significant. For example, for cells in the Los Angeles basin, the correctly-calculated depression angles range from 1° to 3° below the horizontal, whereas basing the depression angle calculation on the station's AGL height gives essentially zero-degree depression angles.

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Because of its use of both ebt and mbt, and mountain top transmitting site with its high AMSL C.O.R. height but low AGL C.O.R. height, KCET-DT is the “critical difference” poster child. Yet, apparently because Commission lacks the software to allow conducting OET-69 interference studies using main beam azimuth patterns and actual elevation patterns (including actual ebt and actual mbt), no relief was forthcoming to CTSC.

KEYT-DT CP To Reduce ERP From 1,000 kW (DA) to 250 kW (DA)

On June 30, 2006, KEYT-DT filed to amend its CP from 1,000 kW ERP (DA) to 250 kW ERP (DA), even though it had certified in its Form 381 filing that it would build replication facilities (*i.e.*, 699 kW ERP (DA)), and even though it had spurned attempts by CTSC to obtain a “consent” letter, wherein CTSC demonstrated that the incremental interference caused by KCET-DT as D28 at 190 kW ERP (DA) to the 1,000 kW ERP KEYT-DT CP had insignificant interference cells falling outside of the Santa Barbara-Santa Maria-San Luis Obispo Designated Market Area (DMA #119).

Furthermore, the June 30, 2006, KEYT-DT application changed the proposed transmitting antenna from a Dielectric Model TFU-24DSB-J (C) directional antenna to an RFT Model CS-2050-SP-24 directional antenna; this impacts the earlier interference studies. As shown by the attached Figure 1, an updated OET-69 post-transition interference study, for KCET-DT as D28 at 190 kW ERP (DA) causes incremental interference of just 0.04% to the KFTR-DT TCD29, and decreased interference of 0.1% to the 699 kW ERP KEYT-DT TCD27. Indeed, as shown by the attached Figure 2, KCET-DT as D28 could increase its main-beam ERP to 302 kW without causing more than 0.1% of incremental interference to the 699 kW ERP KEYT-DT TCD27. Further, and as shown by the attached Figure 2, if the KEYT-DT TCD27 is modified to the now permitted KEYT-DT 250 kW ERP facilities, KCET-DT as D28 could increase its main-beam ERP to 510 kW without causing more than 0.1% of incremental interference to KEYT-DT. However, because CTSC specified its 340 kW maximized D59 facilities in its Form 381 Pre-election Certification Form, greater power cannot be requested at this stage of the DTV process. But, Figures 2 and 3 demonstrate that once the August 3, 2004, “Freeze Order” is lifted, and post-transition DTV stations are once again free to file for increased power facilities, greater power should be possible for KCET-DT as D28.[§] Finally, it should be noted that all of these studies are based on the distorted horizontal plane azimuth pattern, the OET-69 generic UHF elevation pattern, and using the “normal” FCC method of calculating the depression angles to cells under study; that is, it has not been necessary to resort to the more accurate use of station’s actual main beam azimuth

[§] It is noted that since the TCD for KTLA-DT, D31, Los Angeles, is 1,000 kW ERP, and since KTLA-DT is similarly located at the Mt Wilson antenna farm, the normal limits on ERP vs HAAT given in Section 73.622(f)(8) of the FCC Rules are superseded by the Section 73.622(f)(5) “largest station in the market” rule. Thus, for the KCET-DT as D28 effective height of 926 meters (corresponding to the existing KCET, N28, Andrew Model 35E4 center-of-radiation height), the normal ERP limit of 154 kW for a HAAT of 926 meters does not apply.



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pattern, actual elevation pattern, actual ebt, actual mbt (where used), and correctly calculated depression angles to cells under study.

Mexican Considerations

In the U.S.-Mexico DTV Letter of Understanding (LOU), DTV Channel 28 was assigned to Tijuana, Mexico. Data on the XHJK-DT, D28, facilities has only recently become available. A copy of that station's somewhat strange azimuth pattern is shown in the attached Figure 4. However, the Figure 1, 2 and 3 channel election OET-69 interference studies show that no incremental interference to the XHJK-DT facilities is predicted. While these studies consider only U.S. XHJK-DT population, and not Mexican population, it follows that if zero persons of incremental interference is caused to XHJK-DT cells in the U.S., there is also zero persons of incremental interference to XHJK-DT cells falling in Mexico, since those cells are a) closer to the XHJK-DT transmitter and b) even further from KCET-DT as D28.

Summary

The Seventh FNPRM assigned CTSC its requested D28 for the post-transition KCET-DT operation, but at a power level of only 107 kW ERP (DA). To achieve the maximized footprint specified in its Form 381 Pre-Election Certification filing, KCET-DT needs a higher ERP of 190 kW. This higher power would cause less than 0.1% incremental interference to both KFTR-DT, TCD29 and to KEYT-DT, TCD27. Finally, the post-transition operation of KCET-DT as D28 at 190 kW ERP (DA) would cause no incremental interference to the U.S. side of the XHJK-DT, D28, Tijuana, post-transition coverage. For these reasons the Report & Order (R&O) to the Seventh FNPRM should assign a higher power of 190 kW ERP (DA) to KCET-DT's post-transition operation.

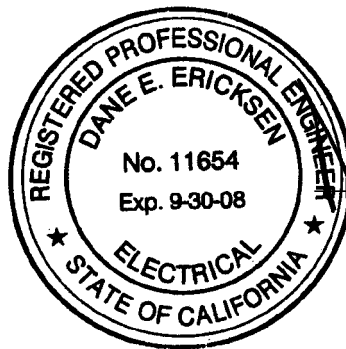


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List of Figures

In carrying out these engineering studies, the following attached figures were prepared under my direct supervision:

1. Channel election conflict study for KCET-DT as D28 at 190 kW ERP (DA)
2. Channel election conflict study for KCET-DT as D28 at 302 kW ERP (DA)
3. Channel election conflict study for KCET-DT as D28 at 510 kW ERP (DA), and the KEYT-DT TCD29 modified to the 250 kW ERP (DA) KEYT-DT modified CP facilities
4. XHJK-TV, D28, azimuth pattern.



A handwritten signature in black ink, appearing to read "Dane E. Ericksen", written over a horizontal line.

Dane E. Ericksen, P.E.

January 5, 2007



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Post-Transition OET-69 Interference Study for KCET-DT at 190 kW ERP (DA)
Based on HPLANE Azimuth Pattern and OET-69 Generic Elevation Pattern

OET-69 Interference Analysis, 2000 Census
tvstudy v3.2.12

Channel-election conflict study, in-core only, DTV protection only

This interference study is based on 1.00 x 1.00 kilometer cells and terrain profiles with 10.0 points per kilometer. FCC processing using these finer-resolution parameters is hereby requested, pursuant to the Commission's August 10, 1998, Public Notice, "Additional Application Processing Guidelines for DTV."

Default emission mask for digital Class A and LPTV/translator records: simple

Before case parameters:
(same as original below)

After case parameters:

	--Modified-----	--Original-----
Station:	D28 KCET TCD	D28 KCET TCD
City:	LOS ANGELES, CA	LOS ANGELES, CA
Facility ID:	13058	13058
Coordinates:	N 34-13-26.0	N 34-13-26.0
	W 118-03-43.8	W 118-03-43.8
Height AMSL:	1825.5 m	1812.0 m
Maximum ERP:	190 kW	107 kW
Azimuth pattern:	kcetN28.17555az.pat	REP-REPLICATION
Orientation:	0.0	0.0
Elevation pattern:	OET-69 generic	OET-69 generic
Service level:	40.1 dBu	40.1 dBu

				Before		After		%Chng
Protected station				Base Pop	IX Change %Base	IX Change %Base		
D27	KEYT-TV TCD	SANTA BARBARA, CA	1,326,950	23,649	1.8	22,338	1.7	-0.10
D28	KMPH-TV TCD	VISALIA, CA	1,433,142	-680	-0.0	-680	-0.0	0.00
D29	KFTR-TV TCD	ONTARIO, CA	14,597,676	-65,530	-0.4	-60,395	-0.4	0.04
N25nA	KNET-LP LIC	LOS ANGELES, CA	4,910,276	18	0.0	18	0.0	0.00
N26zA	KSFV-LP LIC	SAN FERNANDO VA, CA	1,104,997	586,652	53.1	586,652	53.1	0.00
N28+A	K28FK LIC	SAN LUIS OBISPO, CA	201,480	205	0.1	205	0.1	0.00

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**Post-Transition OET-69 Interference Study for KCET-DT at 190 kW ERP (DA)
Based on HPLANE Azimuth Pattern and OET-69 Generic Elevation Pattern**

Modified record parameters:

```
--Modified-----
Station: D28    XHJK-DT GRANT
City: TIJUANA, MEXICO
Facility ID:    n/a (Mexican DTV)
Coordinates: N  32-30-08.0
               W 117-02-21.0
Height AMSL:   375.0 m
Maximum ERP:    550 kW
Azimuth pattern: xhjkD28az.pat
Orientation:    0.0
Elevation pattern: OET-69 generic
Service level:  40.1 dBu
```

Note: The results of the OET-69 algorithm are dependent on the use of computer databases and complex software algorithms, which may vary between computer platforms and installations. Also, while Hammett & Edison, Inc. endeavors to follow official releases and established precedents on the matter, FCC policy on DTV analysis methods changes from time to time. Thus, the results of OET-69 interference and coverage studies are subject to change and may differ from FCC results.



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**Post-Transition OET-69 Interference Study for KCET-DT at 302 kW ERP (DA)
Based on HPLANE Azimuth Pattern and OET-69 Generic Elevation Pattern**

OET-69 Interference Analysis, 2000 Census
tvstudy v3.2.12

Channel-election conflict study, in-core only, DTV protection only

This interference study is based on 1.00 x 1.00 kilometer cells and terrain profiles with 10.0 points per kilometer. FCC processing using these finer-resolution parameters is hereby requested, pursuant to the Commission's August 10, 1998, Public Notice, "Additional Application Processing Guidelines for DTV."

Default emission mask for digital Class A and LPTV/translator records: simple

Before case parameters:
(same as original below)

After case parameters:

	--Modified-----	--Original-----
Station:	D28 KCET TCD	D28 KCET TCD
City:	LOS ANGELES, CA	LOS ANGELES, CA
Facility ID:	13058	13058
Coordinates:	N 34-13-26.0	N 34-13-26.0
	W 118-03-43.8	W 118-03-43.8
Height AMSL:	1825.5 m	1812.0 m
Maximum ERP:	302 kW	107 kW
Azimuth pattern:	kcetN28.17555az.pat	REP-REPLICATION
Orientation:	0.0	0.0
Elevation pattern:	OET-69 generic	OET-69 generic
Service level:	40.1 dBu	40.1 dBu

				Before		After		
Protected station				IX	%Base	IX	%Base	%Chng
		Base Pop						
D27	KEYT-TV TCD	SANTA BARBARA, CA	1,326,950	23,649	1.8	24,541	1.8	0.07
D28	KMPH-TV TCD	VISALIA, CA	1,433,142	-680	-0.0	-680	-0.0	0.00
D29	KFTR-TV TCD	ONTARIO, CA	14,597,676	-65,530	-0.4	-55,355	-0.4	0.07
N25nA	KNET-LP LIC	LOS ANGELES, CA	4,910,276	18	0.0	18	0.0	0.00
N26zA	KSFV-LP LIC	SAN FERNANDO VA, CA	1,104,997	586,652	53.1	586,652	53.1	0.00
N28+A	K28FK LIC	SAN LUIS OBISPO, CA	201,480	205	0.1	205	0.1	0.00

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**Post-Transition OET-69 Interference Study for KCET-DT at 302 kW ERP (DA)
Based on HPLANE Azimuth Pattern and OET-69 Generic Elevation Pattern**

Modified record parameters:

```
--Modified-----
Station: D28   XHJK-DT GRANT
City: TIJUANA, MEXICO
Facility ID:   n/a (Mexican DTV)
Coordinates: N 32-30-08.0
              W 117-02-21.0
Height AMSL:  375.0 m
Maximum ERP:   550 kW
Azimuth pattern: xhjkD28az.pat
Orientation:    0.0
Elevation pattern: OET-69 generic
Service level:  40.1 dBu
```

Note: The results of the OET-69 algorithm are dependent on the use of computer databases and complex software algorithms, which may vary between computer platforms and installations. Also, while Hammett & Edison, Inc. endeavors to follow official releases and established precedents on the matter, FCC policy on DTV analysis methods changes from time to time. Thus, the results of OET-69 interference and coverage studies are subject to change and may differ from FCC results.



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**Post-Transition OET-69 Interference Study for KCET-DT at 510 kW ERP (DA)
Based on HPLANE Azimuth Pattern and OET-69 Generic Elevation Pattern
Based on KEYT-DT, D27, Santa Barbara TCD Modified to 250 kW ERP (DA) CP Facilities**

OET-69 Interference Analysis, 2000 Census
tvstudy v3.2.12

Channel-election conflict study, in-core only, DTV protection only

This interference study is based on 1.00 x 1.00 kilometer cells and terrain profiles with 10.0 points per kilometer. FCC processing using these finer-resolution parameters is hereby requested, pursuant to the Commission's August 10, 1998, Public Notice, "Additional Application Processing Guidelines for DTV."

Default emission mask for digital Class A and LPTV/translator records: simple

Before case parameters:
(same as original below)

After case parameters:

	--Modified-----	--Original-----
Station:	D28 KCET TCD	D28 KCET TCD
City:	LOS ANGELES, CA	LOS ANGELES, CA
Facility ID:	13058	13058
Coordinates:	N 34-13-26.0	N 34-13-26.0
	W 118-03-43.8	W 118-03-43.8
Height AMSL:	1825.5 m	1812.0 m
Maximum ERP:	510 kW	107 kW
Azimuth pattern:	kcetN28.17555az.pat	REP-REPLICATION
Orientation:	0.0	0.0
Elevation pattern:	OET-69 generic	OET-69 generic
Service level:	40.1 dBu	40.1 dBu

				Before		After		%Chng
Protected station				Base	Pop	IX	Change %Base	
D27	KEYT-TV TCD*	SANTA BARBARA, CA	1,326,950	231,671	17.5	232,527	17.5	0.06
D28	KMPH-TV TCD	VISALIA, CA	1,433,142	-680	-0.0	-680	-0.0	0.00
D29	KFTR-TV TCD	ONTARIO, CA	14,597,676	-65,530	-0.4	-52,256	-0.4	0.09
N25nA	KNET-LP LIC	LOS ANGELES, CA	4,910,276	18	0.0	18	0.0	0.00
N26zA	KSFV-LP LIC	SAN FERNANDO VA, CA	1,104,997	586,652	53.1	586,652	53.1	0.00
N28+A	K28FK LIC	SAN LUIS OBISPO, CA	201,480	205	0.1	205	0.1	0.00

* Record parameters modified

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**Post-Transition OET-69 Interference Study for KCET-DT at 510 kW ERP (DA)
Based on HPLANE Azimuth Pattern and OET-69 Generic Elevation Pattern
Based on KEYT-DT, D27, Santa Barbara TCD Modified to 250 kW ERP (DA) CP Facilities**

Modified record parameters:

	--Modified-----	--Original-----
Station:	D27 KEYT-TV TCD	D27 KEYT-TV TCD
City:	SANTA BARBARA, CA	SANTA BARBARA, CA
Facility ID:	60637	60637
Coordinates:	N 34-31-32.0	N 34-31-32.0
	W 119-57-28.0	W 119-57-28.0
Height AMSL:	1252.0 m	1265.0 m
Maximum ERP:	250 kW	699 kW
Azimuth pattern:	keytD27cp.73232az.pat	rep-CASANTA_BARB27
Orientation:	0.0	0.0
Elevation pattern:	OET-69 generic	OET-69 generic
Service level:	40.0 dBu	40.0 dBu

Modified record parameters:

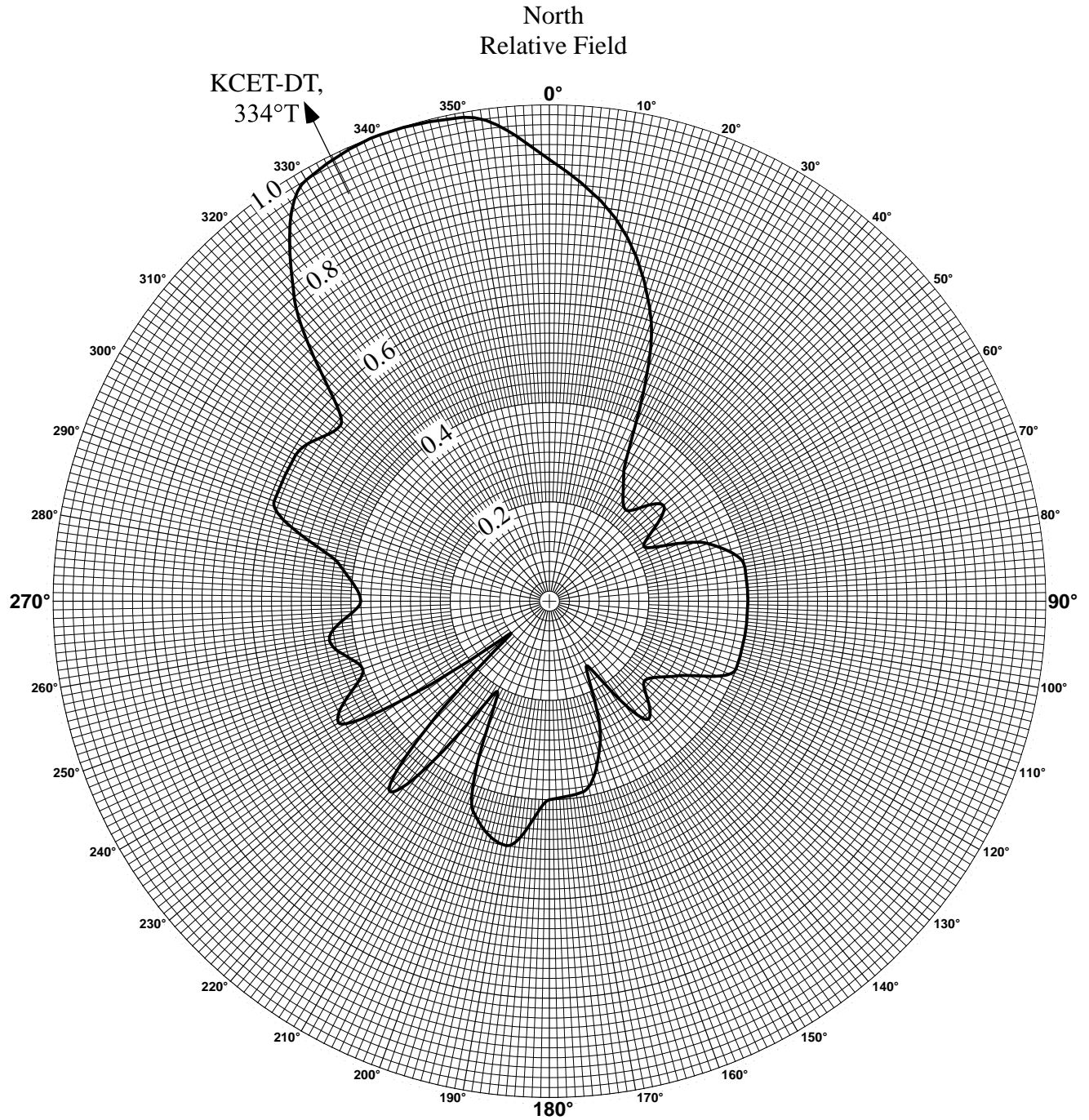
	--Modified-----
Station:	D28 XHJK-DT GRANT
City:	TIJUANA, MEXICO
Facility ID:	n/a (Mexican DTV)
Coordinates:	N 32-30-08.0
	W 117-02-21.0
Height AMSL:	375.0 m
Maximum ERP:	550 kW
Azimuth pattern:	xhjkD28az.pat
Orientation:	0.0
Elevation pattern:	OET-69 generic
Service level:	40.1 dBu

Note: The results of the OET-69 algorithm are dependent on the use of computer databases and complex software algorithms, which may vary between computer platforms and installations. Also, while Hammett & Edison, Inc. endeavors to follow official releases and established precedents on the matter, FCC policy on DTV analysis methods changes from time to time. Thus, the results of OET-69 interference and coverage studies are subject to change and may differ from FCC results.



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XHJK-DT, D28 Tijuana
Azimuth Pattern



Source: FCC International Bureau.



HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

061107
Figure 4A

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**Relative Field Tabulation
for XHJK-DT Azimuth Pattern**

Azimuth °T	Relative Field	Azimuth °T	Relative Field
0°	0.89	180	0.40
10	0.78	190	0.50
20	0.60	200	0.45
30	0.30	210	0.21
40	0.24	220	0.50
50	0.30	230	0.10
60	0.22	240	0.49
70	0.34	250	0.40
80	0.40	260	0.45
90	0.40	270	0.38
100	0.40	280	0.43
110	0.40	290	0.59
120	0.30	300	0.59
130	0.25	310	0.55
140	0.31	320	0.52
150	0.15	330	0.80
160	0.30	340	1.00
170	0.39	350	0.99

Source: FCC International Bureau.

